a fairly considerable number of observed values, provided that it is not extended so far as to include a region within which the distribution of the observed quantity departs seriously from uniformity.

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NOTE ON THE USE OF THE GEOMETRICAL MEAN PARALLAX

In the preceding note Professor Russell has pointed out a method of including small values of radial velocities and proper-motion components in the computation of geometrical mean parallaxes according to the formulae in *Mount Wilson Contribution* No. 144. A similar method of dealing with these small quantities was actually employed in the publication cited, namely, that of placing the radial velocities or proper-motion components in a number of classes, and for each class substituting the arithmetical mean for the individual values before taking the logarithms. Thus all radial velocities smaller than 2 km., and all proper-motion components smaller than 0″.010 were put equal to 1 km. and 0″.005, respectively The difference between this method and that of Russell is slight, but the latter is probably to be preferred.

In this connection attention may be called to the fact that, if the proper motions are all very small, the geometrical-mean parallaxes are uncertain on account of the errors in the measurements. In the first place these errors are enhanced in the logarithms; and in the second place they are systematically affected by the circumstance that the arithmetical mean, disregarding the sign, of a series of very small *measured* quantities is systematically larger than the corresponding mean, corrected for observational errors, by a quantity that is of the order of magnitude of the average error in the measurements.

GUSTAF STRÖMBERG.

THE MAGNETIC POLARITY OF THE SUN-SPOT GROUP OF MARCH 21, 1920

The spot group which crossed the central meridian of the Sun on March 21, 1920, was the largest since the great group of August, 1917. Because of its connection with the aurora and magnetic storm of March 22, an account of its magnetic field may be of interest.

On December 26, 1919, spots were first observed in the region which was later to become the scene of great activity. These spots, which were then near the east limb, and south of the equator, developed in a very normal manner and by December 30th formed a small bipolar group with regular polarity. That is, the spots in the preceding part were like the south-seeking end of the compass needle, while the following members were of opposite polarity. This has been true of the great majority of groups in the southern hemisphere since the spot-minimum of 1913. Cloudy weather prevented further observations until January 4, 1920. By that time the group had changed greatly, the leading spot being quite large with a field strength of 3200 gausses at the center of its umbra. Its polarity was that of a south-seeking pole while all but two of the smaller spots, which followed, were of opposite polarity, ranging in field strength from 1000 to 2500 gausses.

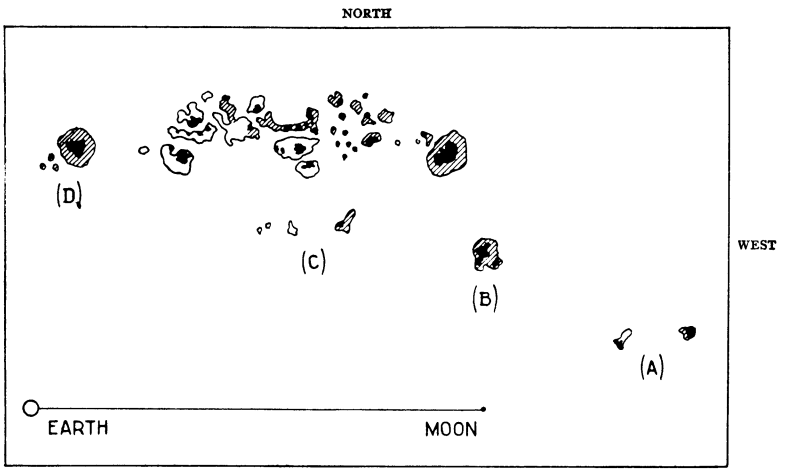

FIGURE 1. SUN-SPOT GROUP OF MARCH, 1920.
(One-inch=100,000 miles).

At its next appearance no observations were made until January 23rd when it was beginning to show complex magnetic structure. The foremost member of the group was just south of the equator while the following spot was nine degrees south and twenty-two degrees east of the leader. The inclination of the group to the solar equator was, therefore, about twenty-five degrees. At its first appearance the group was nearly parallel to the equator but there is no evidence that the change came about by a rotation of the group. It had changed in character so much by the addition of new

spots that none of the individual spots could be identified with certainty as previous members of the group. Altho the magnetic polarities were complex in their distribution thruout the following part of the group, the leading spots were regular. Large active groups often show complexities of this sort.

At its next return cloudy weather prevented observations except on one day. The group was then much smaller and more regular in its polarity.

At the fourth appearance it had developed again into a remarkable "stream." The reproduction is a tracing from a photograph on March 20th. The shaded spots correspond to a south-seeking pole, those of opposite polarity are shown in outline only. The large spot at the western end of the group and the eastern spot (D) had field strengths of 3000 gausses each. Near the center of the group is a spot in which regions of both polarities are shown. The field strength across the neutral lines was practically constant, about 1500 gausses, but the lines of force were there tangential to the Sun's surface. They can be considered as coming vertically out of the open area, turning and going down into the shaded regions. The small bipolar group (A), the unipolar spot (B), and the small bipolar group (C) are evidently not a part of the large group. This is verified by the hydrogen ($H\alpha$) and calcium (K_2) spectroheliograms. Because of its polarity one might also separate the extreme eastern spot (D) from the main group. The spectroheliograms partially substantiate this view tho not as strongly as for the other spots just mentioned. Disregarding these nearby spots the main group shows the regular bipolar characteristics but with some complications in its central part.

At the April return the large leading spot was all that remained of the group. It was then a stable spot with a field strength of 3100 gausses. The eastern spot (D) was fast dying out, having in April a mean field strength of only 1000 gausses. In May the large spot again returned but was then on the decline. It died out gradually; the last spots in that region were seen on May 16th. The group had been active for almost five months, passing the central meridian six times, a record of activity which is seldom equalled.

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